# *RHEGMINORNIS* RESTUDIED: A TINY MIOCENE TURKEY

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The only fossil form referred to the Jacanidae is the Miocene *Rhegminornis calobates* Wetmore (1943), described from a distal end of a right tarsometatarsus. An interest in that family induced us to restudy this specimen, with the result that it proved to be neither a jacana nor a Charadriiform, but a galliform in the family Meleagrididae. This prompted us to examine other galliform material from the same locality—the Lower Miocene deposits at Thomas Farm, 8 miles north of Bell, Gilchrist County, Florida.

## DESCRIPTION AND COMPARISONS

*Rhegminornis calobates* was assigned to the order Charadriiformes, superfamily Charadrioidea, by Wetmore (op. cit.). It was said to differ from the other groups in that superfamily in the relative positions of the trochleae and in the large scar for the hallux, indicating a much better-developed first toe. Wetmore created the family Rhegminornithidae for the species. He stated (op. cit.:6) that "the fossil shows a stage slightly intermediate between that found in the Scolopacidae and Charadriidae and the Jacanidae. The evident size of the hallux also is reminiscent of the latter family. . . ." This statement led Brodkorb (1967) to consider the species as forming a subfamily (Rhegminornithinae) of the Jacanidae.

The type element of *Rhegminornis* (MCZ 2331) actually shows no resemblance to the specialized tarsometatarsus of the Jacanidae, differing in the greater width of the shaft, in having the inner and outer trochleae much more elevated, the inner trochlea not as enlarged and bulbous, and in lacking the distinct spur on the dorso-lateral corner of the posterior face of the inner trochlea. The scar for the hallux is not as deep; the distal foramen is not located as far distally, is oval rather than circular, and is much smaller, with a much shallower outer extensor groove than in the Jacanidae. The measurements of the type are: width through trochleae 9.5 mm; depth of middle trochlea 4.6; least depth of shaft 2.9; least width of shaft 3.9; overall length of specimen 29.6.

In the relative positions of the trochleae and large scar for the hallux, characters used by Wetmore to establish the family Rhegminornithidae, *Rhegminornis* agrees with typical Galliformes. In the following particulars as well, the type of *Rhegminornis* differs from the shorebirds and agrees with most of the Galliformes.

*Inner trochlea.*—In posterior view (Fig. 1b), the external side is flat and linear, not rounded nor extending laterally past the line of the internal side of the middle trochlea.

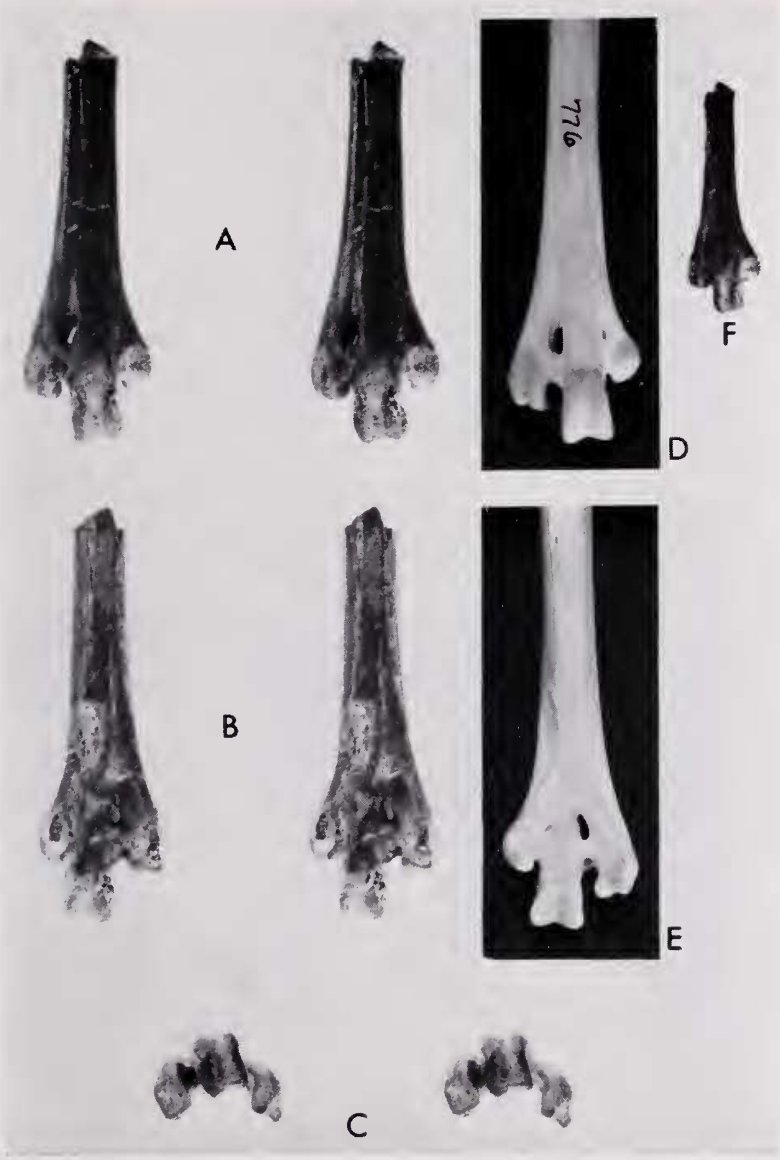


FIG. 1. a, b, c. Stereophotographs of the tarsometatarsus of *Rhegminornis calobates* (holotype, MCZ 2331), about twice natural size (a. anterior view—inner intertrochlear foramen barely visible as a whitish spot; b. posterior view; c. distal view). d, e. Tarsometatarsus of a small female *Meleagris gallopavo*, natural size (d. anterior view; e. posterior view). f. Holotype of *Rhegminornis calobates*, natural size.

In internal view (Fig. 2a), the trochlea forms a distinct bulge distally, with the wing sharply set off from the articulating surface by a distinct pit; the roughened articular surface is much larger and extends farther proximally. In distal view (Fig. 1c), the wing projects more medially rather than directly posteriorly and is more distinctly set off from the rest of the trochlea. As noted by Wetmore, the inner trochlea is not so strongly rotated towards the median axis of the shaft and is thus more nearly in the plane of the other trochleae.

*Middle trochlea.*—In posterior view (Fig. 1b), the articular surface is more distinctly set off from the shaft of the trochlea, especially on the internal side, and extends farther proximally on the external side. In internal view (Fig. 2a), the internal side is more excavated, with a more distinct rim. In external view (Fig. 3b), the external face bears a squared depression, unlike the deeper more circular pit of the shorebirds.

*External trochlea.*—In posterior view (Fig. 1b), the shape of the articular surface is quite different from that of the Charadrioidea, with the external side extending much farther proximally. In external view (Fig. 2b), there is a distinct groove on the posterolateral portion of the trochlea to accommodate a ligament attaching the outer toe to the tarsus. This groove is a characteristic feature of the Galliformes but is absent in the Charadrioidea.

These comparisons suffice to remove *Rhegminornis* from the Charadriiformes and place it with the Galliformes. The question of its proper allocation within the latter order may now be explored.

*Rhegminornis* differs from the Cracidae and Megapodiidae in the following respects: inner trochlea much more elevated, middle trochlea rotated medially, external trochlea more elevated, distal foramen much larger, and the scar for the hallux with a single facet (as opposed to a distinct, polished, circular proximal facet and an elongated, less distinct, distal facet).

From the Tetraonidae it differs in many characters, including the shape and positions of the trochleae, the relatively broader shaft with less expanded distal end, larger distal foramen, and larger scar for the hallux.

*Rhegminornis* differs from the Phasianidae (sensu stricto) and agrees with the Meleagrididae in the more elevated internal trochlea, larger and more elongate distal foramen, and the presence of a distinct, although small, *inner* intertrochlear foramen. Howard (1927:24) noted that an inner intertrochlear foramen was present in more than half the specimens of *Meleagris* that she examined and that such a foramen, or traces of it, also occurred in *Parapavo* and *Agriocharis* but not in *Pavo*. In *Rhegminornis* the inner foramen is present both anteriorly (barely visible in Fig. 1a) and posteriorly (visible under magnification) in exactly the same position as observed in specimens of *Meleagris* (Fig. 1d and e). We may add here that we did not find an inner intertrochlear foramen in the Charadrioidea. In the tarsometatarsi of *Rhegminornis* and the Meleagrididae, in side view, the middle trochlea curves anteriorly past the line of the shaft whereas in the other Galliformes, including the Phasianidae and the Numididae, the middle trochlea is more nearly in line with the shaft.

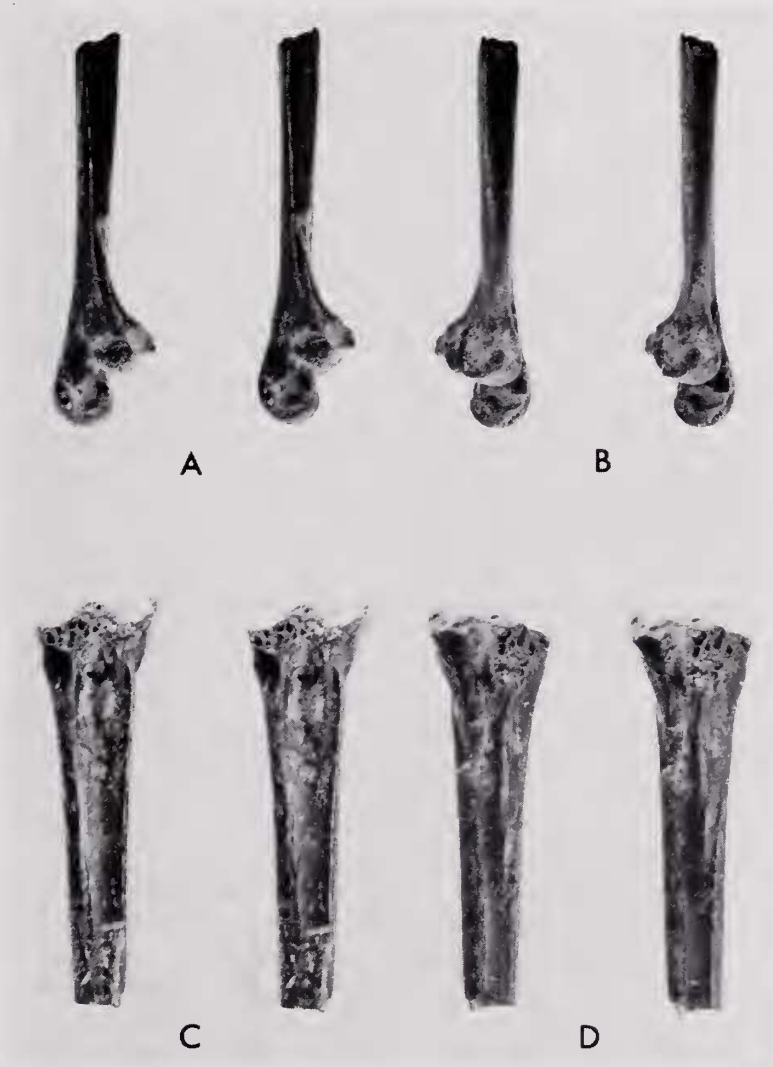


FIG. 2. Stereophotographs of tarsometatarsi of *Rhegminornis calobates*, about twice natural size. a. Holotype (MCZ 2331), internal view. b. Same, external view. c. Referred proximal end (PB 1776), anterior view. d. Same, posterior view.

## DISCUSSION

The proper familial allocation of *Rhegminornis* appears to be with the Meleagrididae. It differs from all modern and fossil turkeys in its much smaller size (Fig. 1f) and more elevated external trochlea, but is otherwise

very similar to modern forms. *Rhegminornis* agrees with *Meleagris* and differs from *Agriocharis* (as well as other Galliformes) in the more medially rotated middle trochlea. It more closely resembles *Agriocharis*, however, in having the trochleae less divergent and the distal foramen in posterior view smaller than in *Meleagris* (see Fig. 1).

At least two other bones from the Thomas Farm deposits are referable to *Rhegminornis*. One of these (PB 8447) is another distal end of a right tarsometatarsus, much abraded and lacking the external trochlea; it is virtually identical to the type except that the scar for the hallux is more distinct. The other specimen (PB 8448) is an imperfect proximal end of a right tarsometatarsus (Fig. 2c and d) lacking much of the hypotarsus and part of the external cotyla. This differs from the tarsometatarsus of the Cracidae in the more excavated anterior shaft, the more medial position of the tubercle for tibialis anticus, the much more medially expanded internal cotyla, and particularly in not having the shaft greatly thinned and bladelike just distal to the internal cotyla as seen in the Cracidae.

In all of these respects the specimen agrees very closely with the Meleagrididae. From *Meleagris* and *Agriocharis* it differs principally in having the shaft somewhat less deeply excavated anteriorly and posteriorly, and in having the tubercle for the tibialis anticus narrower and more clearly defined. The thin, ossified intertendinal septum extending down the shaft from the hypotarsus in modern turkeys and certain other Galliformes is absent in *Rhegminornis*, but this variable feature is probably of little taxonomic significance. Likewise, there is no evidence of a spur in *Rhegminornis*, although this may only mean that the specimens were from females.

From the same deposits at Thomas Farm, a new genus and species of cracid, *Boreortalis laesslei* Brodkorb (1954), was described. The type (PB 743) is a distal end of a right tibiotarsus lacking the internal condyle and the posterior portion of the external condyle. The fragmentary condition of the type and the fact that Brodkorb noted several differences between it and modern cracids suggested the possibility that *Boreortalis* might actually be referable to *Rhegminornis*. This, however, proved not to be the case. In the type of *Boreortalis* the remains of the internal condyle show that it was better developed proximally than in turkeys, with a projection extending over the opening distal to the tendinal bridge—a decidedly cracid feature. Also, the tubercle on the tendinal bridge is more medially located in *Boreortalis* and most cracids than it is in the turkeys.

Furthermore, there is additional unquestionable cracid material in the Thomas Farm deposits. A distal portion of a left tarsometatarsus (UF 2905) shows all the distinctive features of the Cracidae and indicates a species slightly smaller than *Penelope superciliaris*, as does a proximal end of a right

tarsometatarsus (PB 8450). A distal end of a left femur (PB 1776) is from a cracid very slightly smaller than *Ortalis vetula*. The type of *Boreortalis laesslei* was described as being between *Ortalis vetula* and *Penelopina nigra* in size (and is somewhat larger than *Rhegminornis*). It seems possible that more than one species of cracid is represented in the Thomas Farm deposits. In any event, *Boreortalis* is not a turkey and therefore not a synonym of *Rhegminornis*.

Cracraft (1971) has assigned two distal ends of humeri from Thomas Farm to *Boreortalis*. In the better preserved of these specimens (MCZ 7068), the deeper olecranal fossa, the apparently broader and less curved shaft, much less distally projecting entepicondyle, and shallower brachial depression are more similar to *Meleagris* than to the Cracidae. On the other hand, it differs from modern turkeys in having no indentation between the internal condyle and the entepicondyle and in having the brachial depression extending farther distally. These fragments, although slightly larger than might be expected for *Rhegminornis*, are possibly not properly assigned to *Boreortalis*. At any rate, we doubt whether any certain determination can be made of them until better material is available.

Up to now, the oldest known turkey was *Proagrioeharis kimballensis* Martin and Tate (1970), from the Upper Pliocene (Kimball formation) of Nebraska. The allocation of *Rhegminornis* to the Meleagrididae extends the fossil record of the family back much farther—into the Lower Miocene. The family otherwise consists of large forms in the genera *Meleagris*, *Agrioeharis*, and *Parapavo*, that are represented by several Pleistocene, as well as two modern, species. *Proagrioeharis* was smaller than any of the Pleistocene turkeys, and *Rhegminornis* was much smaller yet.

The presence of a small but unmistakable turkey as early as the Lower Miocene suggests that the Meleagrididae have had a long history in North America and may well have undergone considerable radiation during the Tertiary. In view of this, it would perhaps be best to regard warily a number of the fossil taxa described from the North American Tertiary and currently assigned either to the Cracidae or the Tetraonidae. Some of these may well prove to be turkeys.

As determined from study of the various vertebrate fossils from Thomas Farm, the environment in the area at the time *Rhegminornis* bones were deposited there was one of a "river flowing through a dry grass-covered plain" (Brodkorb 1954:182). It is not difficult to envision a flock of diminutive turkeys, clucking and scratching its way along a sparsely wooded Florida riverbank. As the little flock moves on out of sight in the brush at the edge of the plain, a bantam-sized cock occasionally displays in Lilliputian splendor, strutting, gobbling and fanning its tail in the Miocene sunshine.

SUMMARY

The fossil species *Rhegminornis calobates*, based on a fragmentary tarsometatarsus from the Lower Miocene deposits at Thomas Farm in central Florida, has previously been regarded as constituting either a distinct family within the Charadriiformes or a subfamily of the Jacanidae. Re-examination of the type, and two additional specimens of the same element here assigned to the species, shows that *Rhegminornis* is actually a galliform referable to the family Meleagrididae. *Rhegminornis* thus becomes the oldest known turkey and is much smaller than modern members of the family. We suggest that the family Meleagrididae has had a fairly long and diverse history in North America. The allocation to the Cracidae of *Boreortalis laesslei*, another galliform bird from the Thomas Farm deposits, is confirmed. Additional cracid material from the same locality, possibly indicating the presence of more than one species is briefly noted.

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